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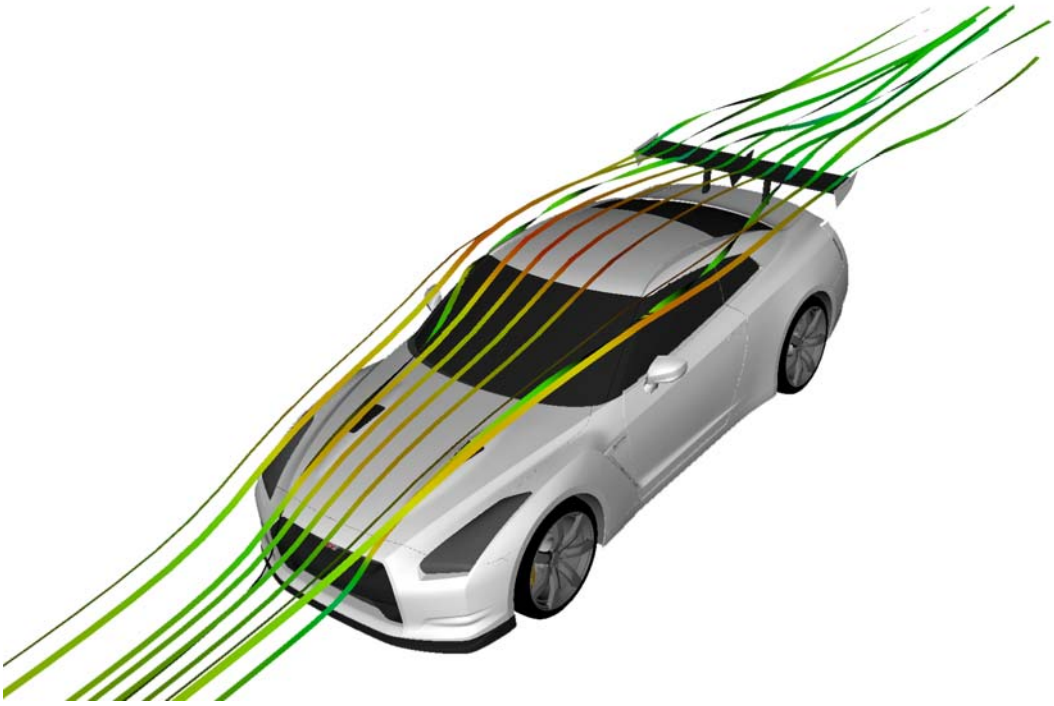
S2 R35 GT-R Install Guide

1. Overview

The Dynamic Wing comes with a plug and play GT-R tune that requires minimal setup. The wing placement and tune were developed through advanced Computational Fluid Dynamic modeling (CFD) and track testing.



2. Wiring

2.1 Power

The wing controller requires 10A switched power. This can be tapped off an existing 10A switched line, or run as a switched relay from the battery.

Tapping into the switched power. There is a 10 amp switched cigarette receptacle toward the back of the center arm rest. This can be tapped to supply the power for the wing. This circuit is already switched and fused. At high speed, the wing will require all 10 amps, in which case, you should not use the cigarette lighter to power any other accessories. Under 90 mph, the wing uses far less power. Most phone chargers are acceptable. Aeromotions recommends you test to make sure. Unplug phone chargers or any additional power draws for track use.

The cigarette lighter can be pulled forward through the console in which it is mounted. Doing so will prevent substantial disassembly of the consosole. The power can be tapped here, and run back through the hole the cigarette lighter came out of.

Running power from the battery. The battery is on the right side of the engine compartment. There is a small rubber stopper behind the battery that goes directly into the cabin. Pull the side panel (lower right passenger side, one plastic thumb screw, then pull panel in towards car evenly - it pops out). Behind that and UP is the ECU and wiring harnesses. Looking farther up and toward the front firewall you will see the hole from the removed stopper.

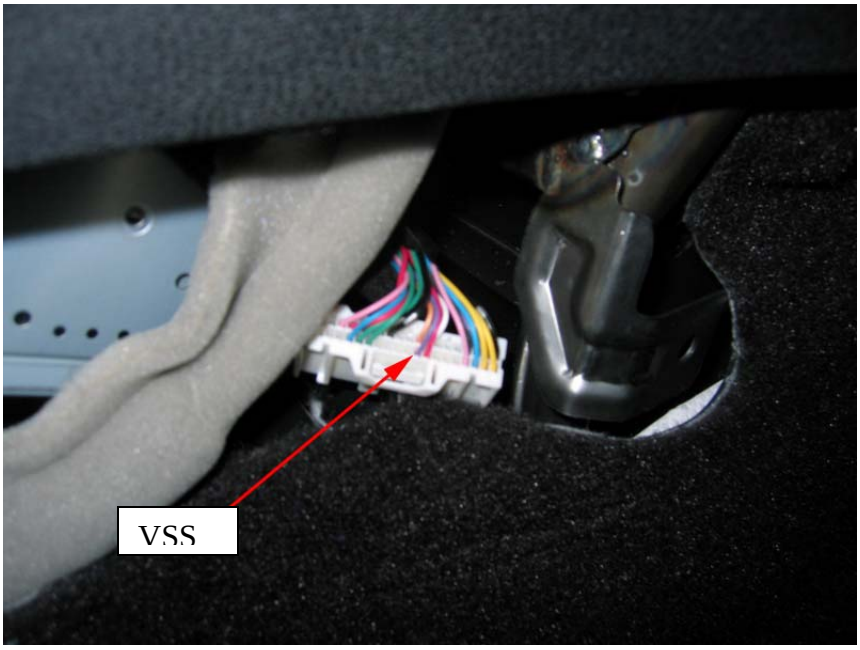
A wire harness goes from the trunk to the spoiler. Inside this harness the power cable makes a long loop. If you cut it off flush, to remove the brake light, the trunk latch will not work. Cutting it half way will keep the power loop intact, and prevent you from having to solder any wires. Put heat shrink or electrical tape on the exposed end.

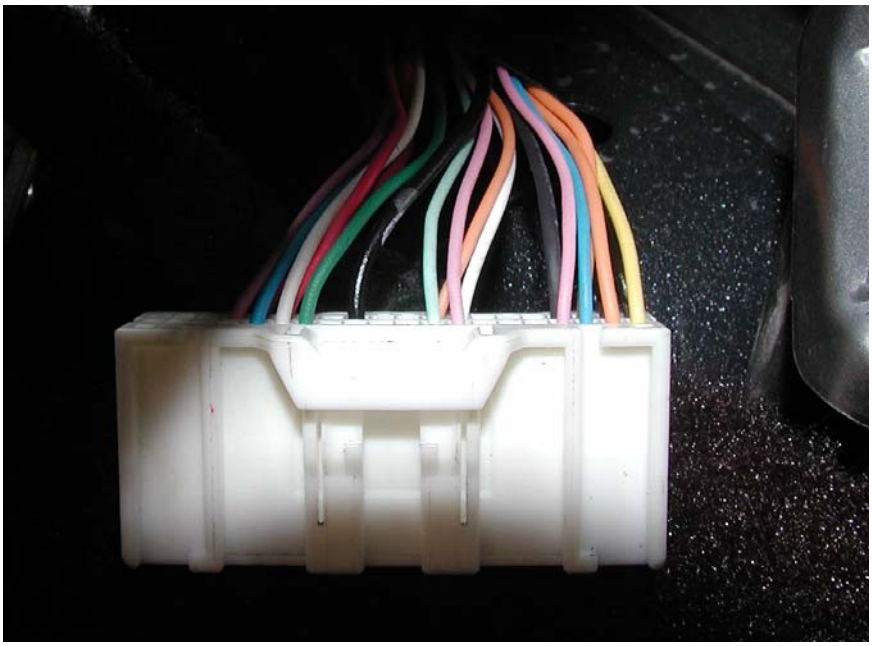
2.2 Vehicle Speed Sensor (VSS)

The VSS provides the vehicle speed to the computer. The VSS is tapped from the dash behind the navigation console. First remove the center console near the passenger seat. It pulls straight out near the center and slides back near the front.

Behind the DVD head unit, there is a WHITE plug with 20+ positions. From the rear of the unit, it would be on the top left corner. From your passenger side view, it's the closest to you on top.

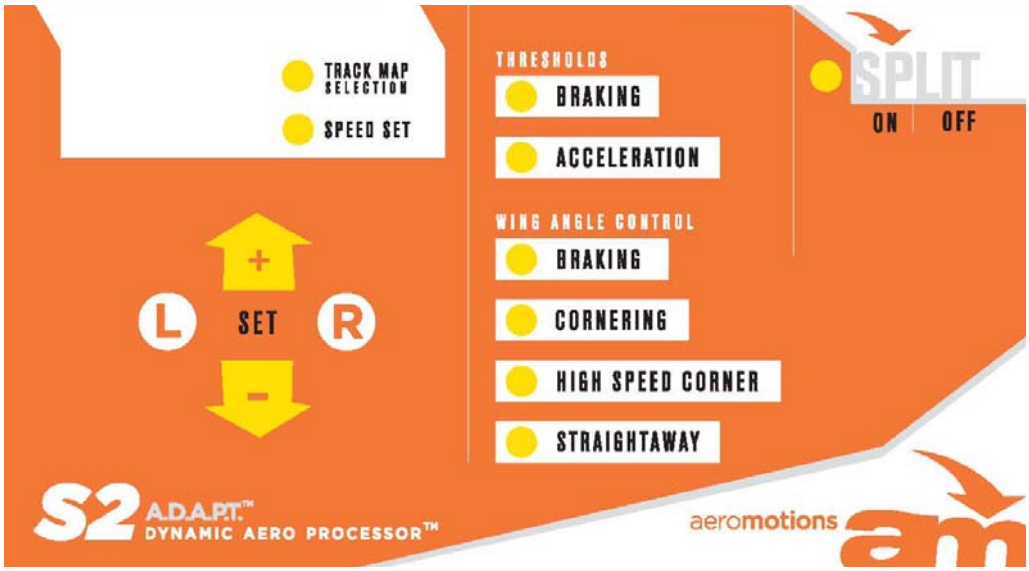
Near the center of the TOP of the plug, is a red power line, right next to that is a VIOLET line. The violet line is the VSS wire. *Note, Australian GT-R's have a light green VSS wire.*





Australian VSS wire, Light Green, in the same location as the USDM VSS.

3. The Control Box



3.1 Mounting

The control box should be mounted in the trunk of the vehicle. It can be mounted right side up on the floor, or upside down on the deck lid. When floor mounted, it is typically centered and against the rear seat divide.

Flat and Level. The control box should be mounted to a flat, level surface in the car. This will ensure the G's read by the control box are the same as those recorded by data acquisition systems. The box can be mounted with the buttons facing up, or with the buttons facing down. The computer will compensate for the inversion of the accelerometer.

Up Arrow Facing Forward. There are two arrows on the control box. The up arrow (+) should face forward.

Exposed to the Air. Mount the box so that the vent fans are unobstructed. Do not enclose the controller in a compartment less than one cubic foot, as overheating might occur. Trunk temperature should not exceed 150F. Ventilation should be added if necessary.

3.2 Electrical Connections

Power Connector

- The ADAPT Controller requires 10Amp switched power.
- +12V is the red wire (on the 2-wire power wire harness).
- The black wire is ground (on the 2-wire power wire harness).

Data Connector

- The Blue wire (of the three wire VSS cable) connects to the vehicle VSS wire. Option for VSS include:
  - VSS wire behind the Nav
  - Stand alone
    - Square wave (OC)
    - 0-5V or 0-12V
    - Preferred pulses per mile is 8,000
  - A sine-wave output from a hall effect sensor generally will not work.

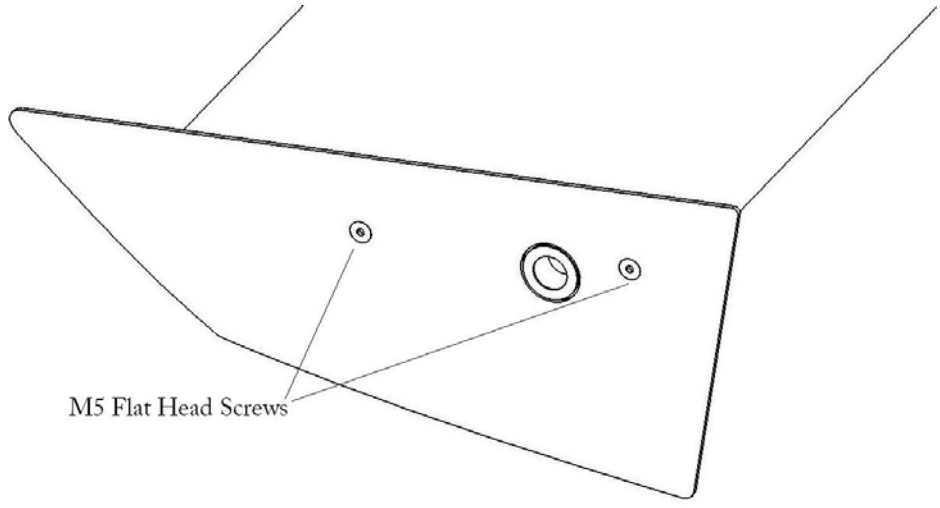
Power Pod Connectors

- The Left and Right Wing Cables should be securely plugged in to the corresponding receptacles on the ADAPT Controller, the cables should not be crossed. For example, the left power pod plugs into the left connector. This is correct when the box is mounted with the label facing up, or label facing down.

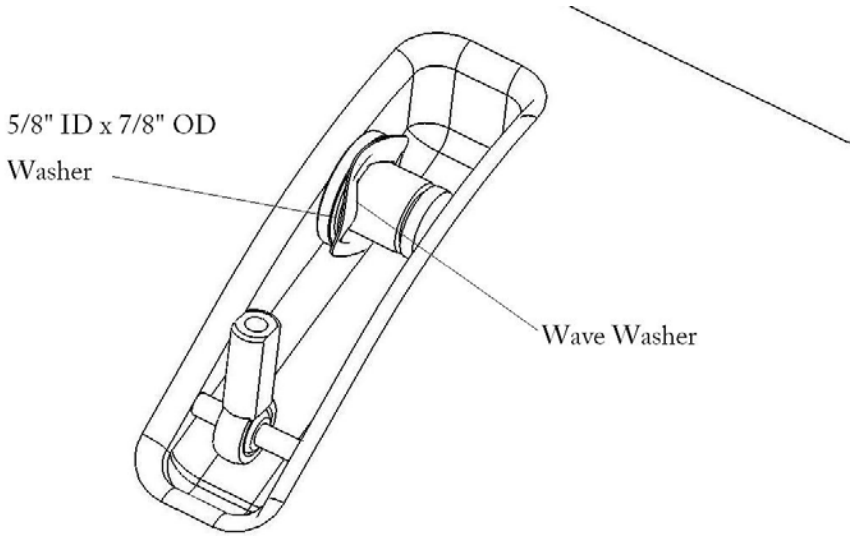
4. Assembling the Wing

The following steps describe how to assemble the wing prior to mounting it to the car.

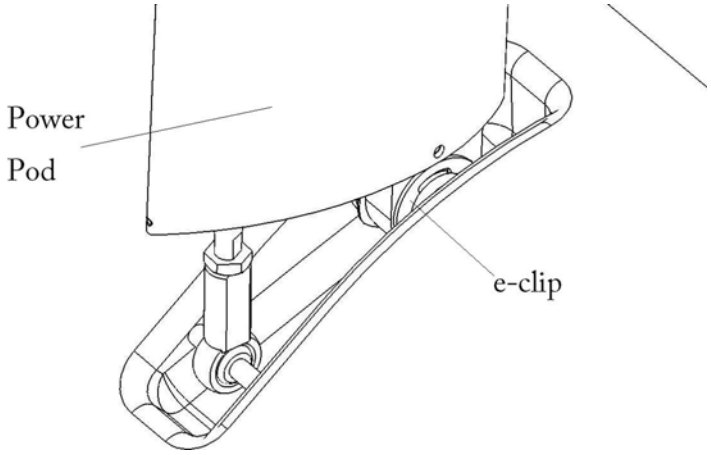
1. Attach the Center Plate to the inside of the Driver's Side Wing Half using the two Flat Head M5 Screws (Max Torque 4 N-m).



2. Insert the Main Pivot Shaft through one wing half.
3. Place one 5/8" ID x 7/8" OD washer on the Main Pivot Shaft where it protrudes into the rectangular recess in the wing (Pivot Box).
4. Place one wave washer on shaft inside the Pivot Box.



5. Slide the power pod onto shaft inside Pivot Box.
   NOTE: The base of the power pods are angled to match the deck lid curvature. The left and right side pods are different angles.
6. Insert 5/8" E-Clip into retaining ring groove on Main Pivot Shaft

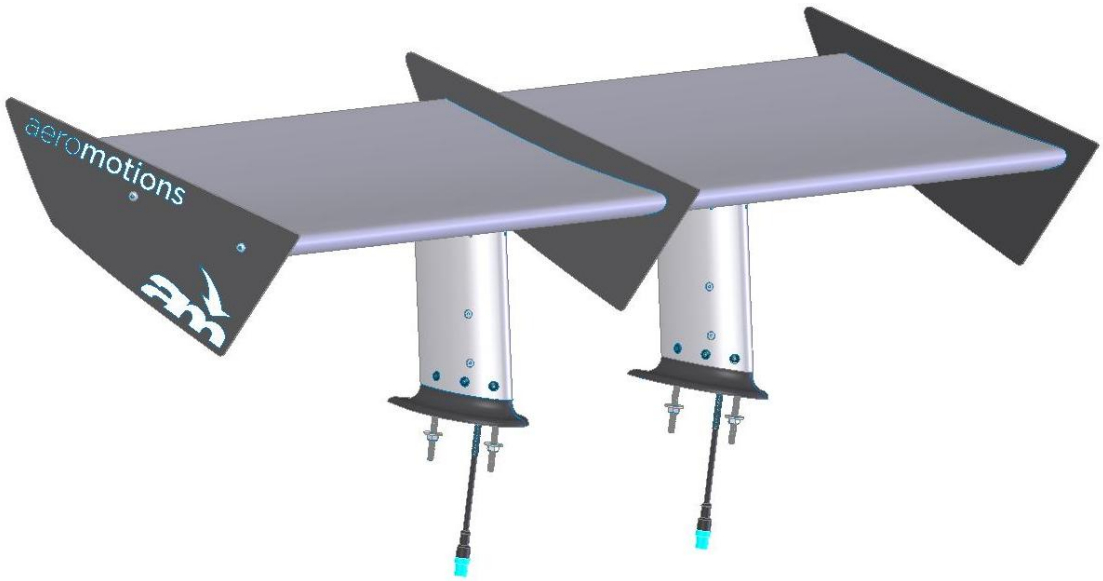


7. Place one 5/8" ID x 1" OD washer on the Main Pivot Shaft where it protrudes out the center end of the wing half. This washer goes between the two wing halves.
8. Place the other Wing Half on the Main Pivot Shaft.
9. Place one 5/8" ID x 7/8" OD washer on the Main Pivot Shaft where it protrudes into the Pivot Box on the second Wing Half.
10. Place one wave washer on shaft inside the Pivot Box.
11. Slide the power pod onto shaft inside Pivot Box.

Insert 5/8" E-Clip into retaining ring groove on Main Pivot Shaft.
NOTE: The power pods will have to be pushed together to get the second E-Clip in place. **NOTE: The wing halves should rotate smoothly.**

12. Mount the wing using the supplied M6 studs (Max Torque 5 N-m).
13. Tighten the M6 (or M5 depending on model) bolts on the top of the Power Pods to secure the wing.
14. After the wing is securely mounted, **check that each wing half pivots freely**, with minimal friction or binding. Failing to do this will **Void Warranty and may cause an unsafe operating condition.** Mounting the wing with excessive shaft binding interferes with the correct operation of the wing.
15. After checking wing articulation, Screw the stainless steel Push Rods on each Power Pod into the rod end in each wing half. Thread the pushrod **all the way** down to the jam nut. It is OK to rotate the Push Rods using a wrench on the flats, do not over tighten.
16. Attach the End Plates using the M5 screws (Max Torque 4 N-m).

5. Mounting an S2 Wing on the R35

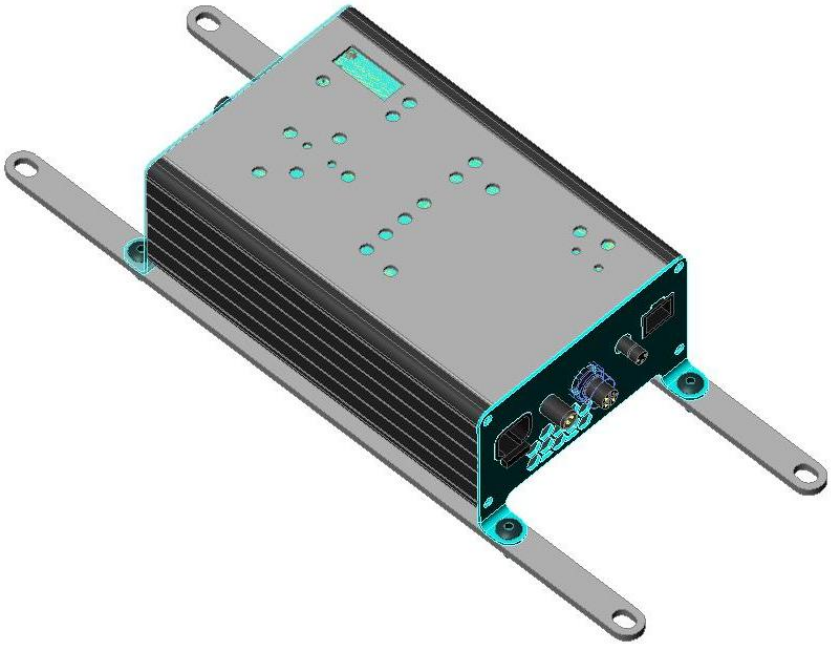


In order to use the stock GTR tune, the wing needs to be mounted in the correct position. The S2 wing mounts with four M6 studs that are permanently mounted to the bottoms of the Power Pods. These can be cut to length. The electrical cables that run to each power pod have a connector (shown in blue) that needs a clearance hole to pass into the trunk.

5.1 Trunk Options

Aeromotions Carbon Fiber Trunk
The Aeromotions R35 carbon fiber trunk comes pre-drilled with all the necessary mounting holes for the wing and computer. Bolt the wing and computer to the trunk as shown below.

S2 Mounted on Trunk



ADAPT Controller with CF trunk mounting adapter rails

Nissan OE Trunk

The OE trunk must be reinforced substantially to securely hold the wing. Bracing needs to be installed span wise in order to take the downforce of the wing. See pictures on next page.

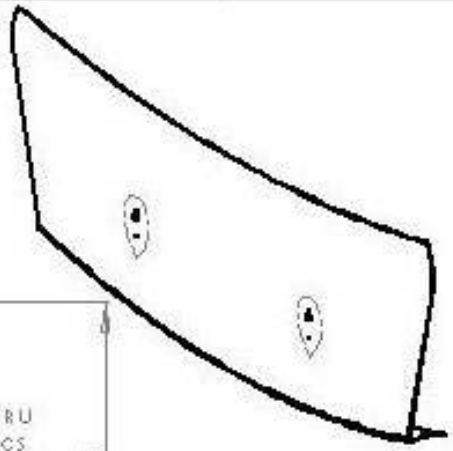
The black aluminum uprights have carbon shells, feet, that adapt the wing to the trunk. These feet should fit snugly into the bottom of the aero tube. The rear tip of each foot should be 5 1/2 inches from rear lip of the trunk.

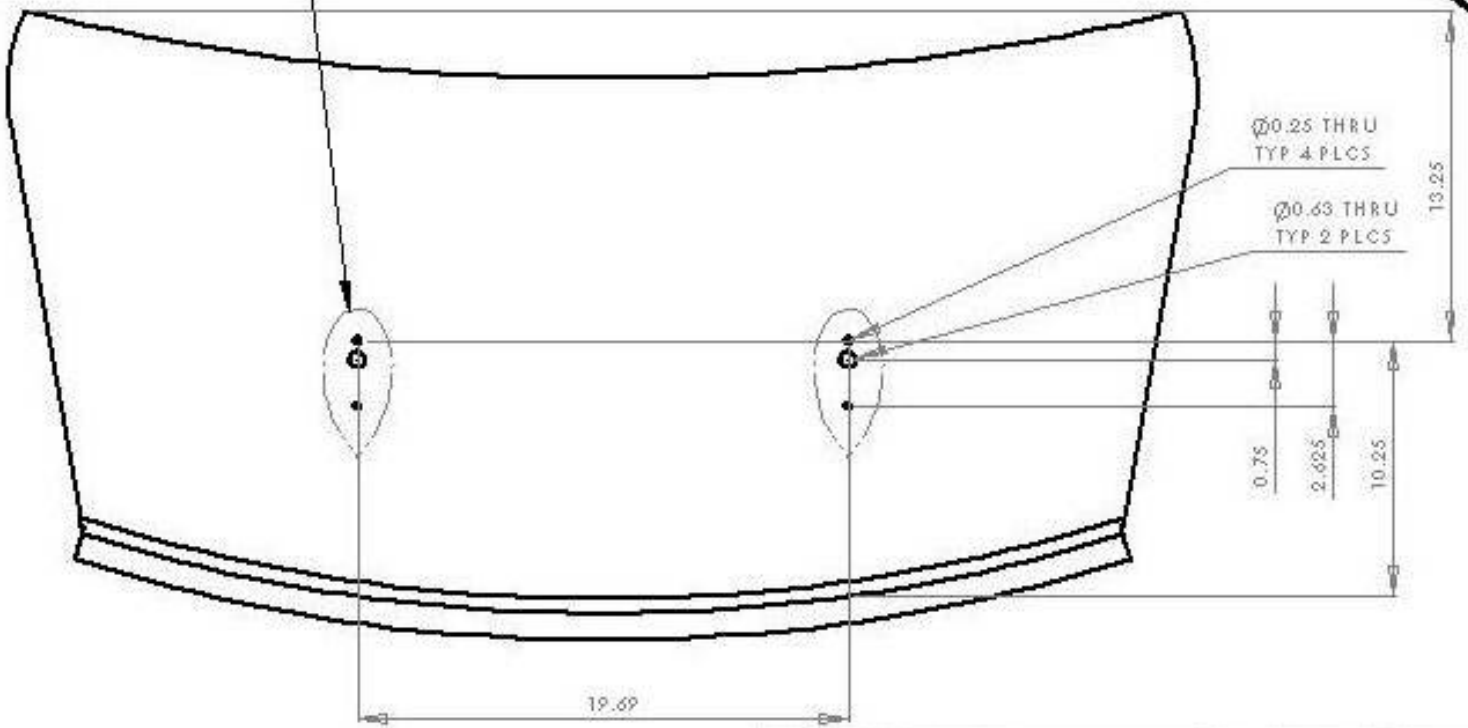
Once positioned, three holes should be drilled per upright. Two are clearance holes for the M6 studs, the third is for the power cable. The three holes are the same as the holes drilled in the carbon fiber feet.

The drawing below (available as pdf drawing W-00329-00-1, Sheet 1) shows the mounting pattern in the top of the trunk. The six holes shown in this drawing should be through holes to accommodate the M6 Studs (4 x Ø.25) and the connectors (2 x Ø.63)

APPROXIMATE FOOT OUTLINE

TOP DECK LID VIEW





UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGULAR: ±1.0 °
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005

MATERIAL CARBON FIBER

FINISH

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	D Wallace	7/6/10
CHECKED		
ENG APPR.		
MFG APPR.		

PROPRIETARY AND CONFIDENTIAL

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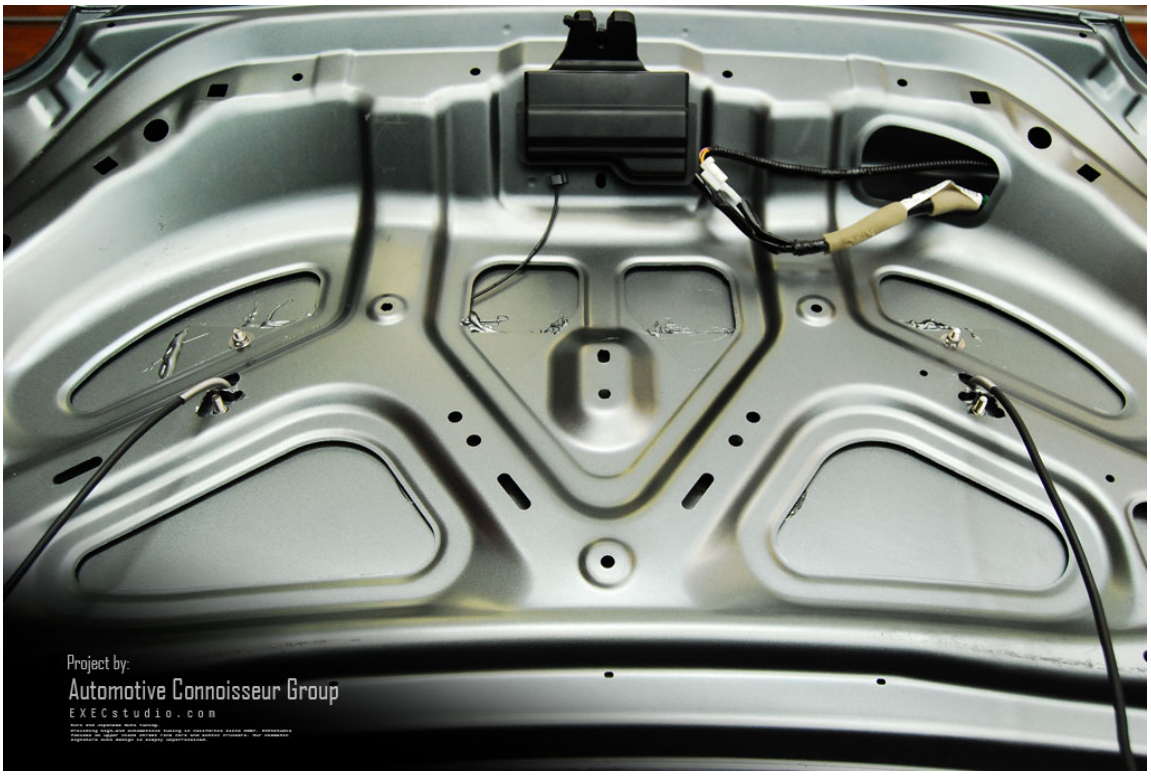
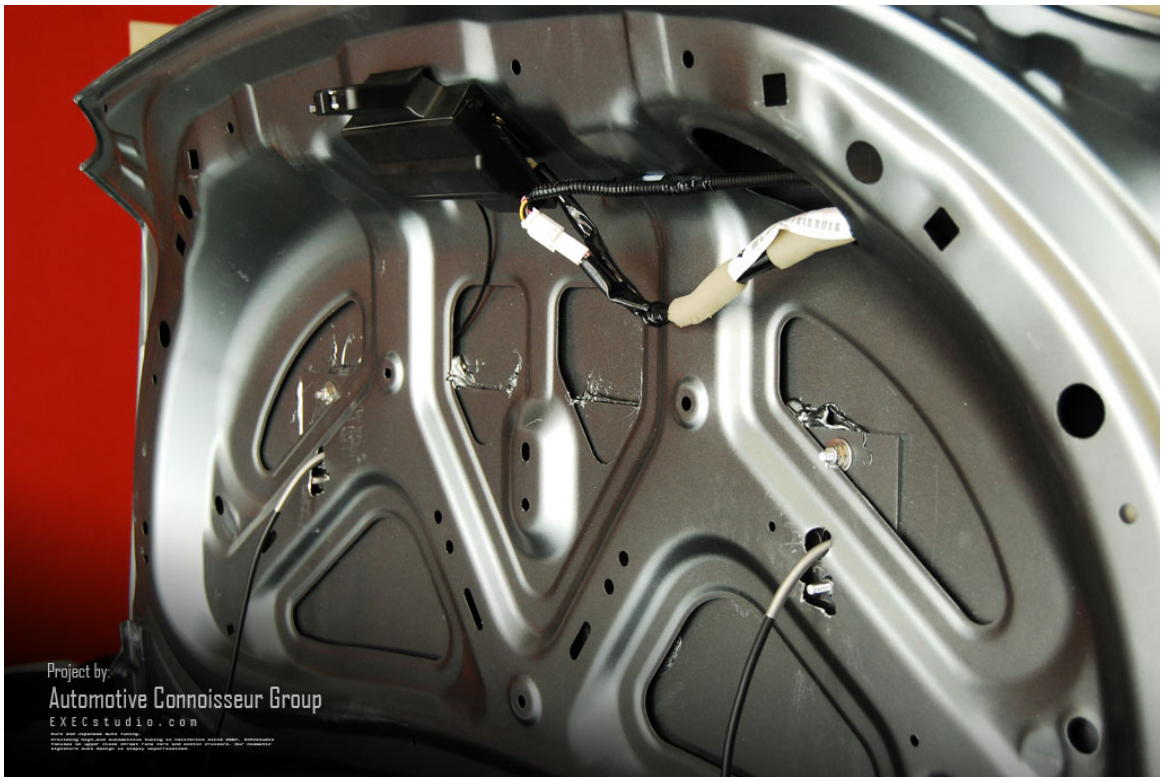
Aeromotions
10A Arizona Rd Cambridge MA 02138

TITLE:
S2 GT-R MOUNT LOCATION

SIZE	DWG. NO.	REV
B	W-00329-00-1	1

SCALE: 1:5 SHEET 1 OF 2


Project by:
Automotive Connoisseur Group
EXECstudio.com


Project by:
Automotive Connoisseur Group
EXECstudio.com

5. Tuning Recommendations

The Braking Angle should not need to be changed. It is the max downforce position for the wing, and is the most efficient way to stop a GT-R. Adding more wing angle will reduce downforce (stall the wing) and increase braking distances.

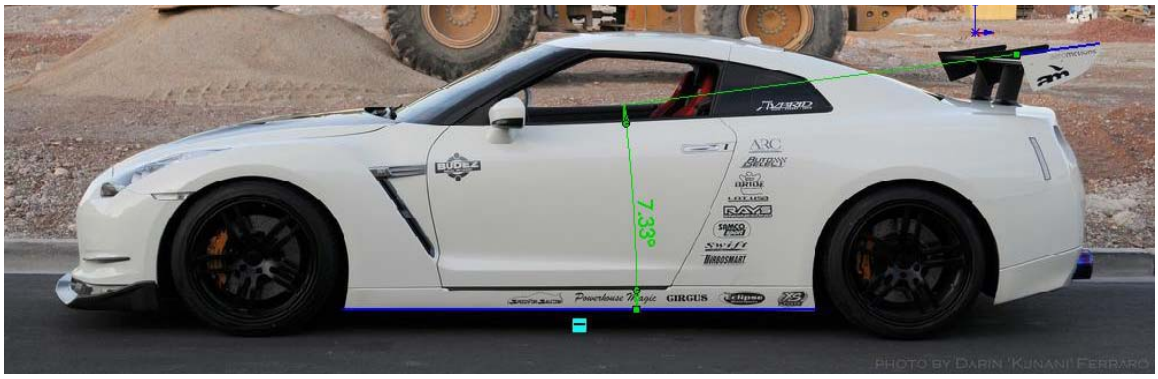
The Cornering Angle is car setup dependent. Adjust it up or down from the starting point to balance the car in corners. Do not exceed the braking angle, or downforce will drop off. Aeromotions has tested with the available splitters for the GT-R. They all produce less downforce than the wing. If your car is loose (oversteer) with the maneuvering angle set all the way up to the braking angle, check your suspension. It's probably not the aero.

Straightaway should nominally be set to 0 degrees. Even at this angle, the highly cambered airfoil produces downforce. Additionally, the air hitting your wing is not coming straight on. The natural downward flow of the air at the wing provides an "apparent" angle of attack greater than 0. A wing set to 0 deg. "sees" a greater angle off attack.

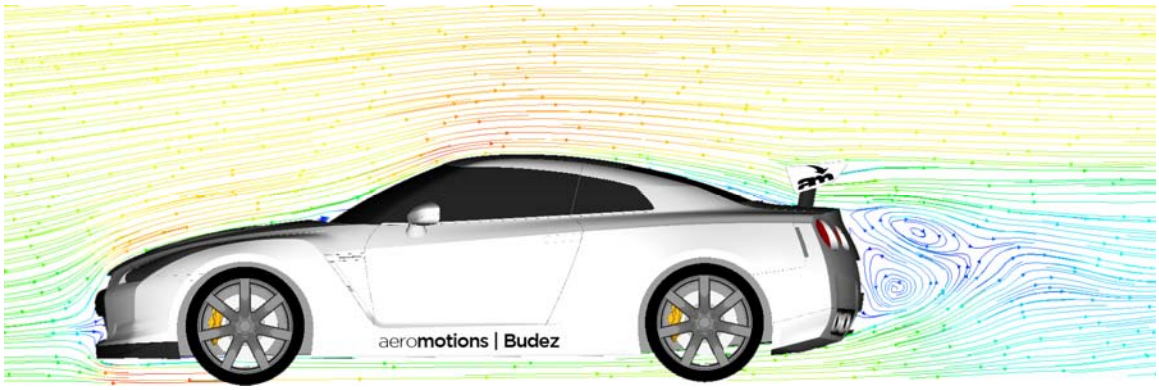
For example, your wing in a wind tunnel stalls at 14.2 degrees. On your GT-R, the center stalls at 7.38 deg. That difference is the angle of the air coming off the back of the car.

On high speed tracks, you can adjust the straightaway angle up to a couple degrees without much drag penalty. If the track gets oiled, or your car is not handling well, we strongly urge you to up the straightaway angle to a couple degrees.

	Degrees
Braking	7.38
High Speed Maneuvering	5
Low Speed Maneuvering	5
Straightaway	0



Measuring Wing Angle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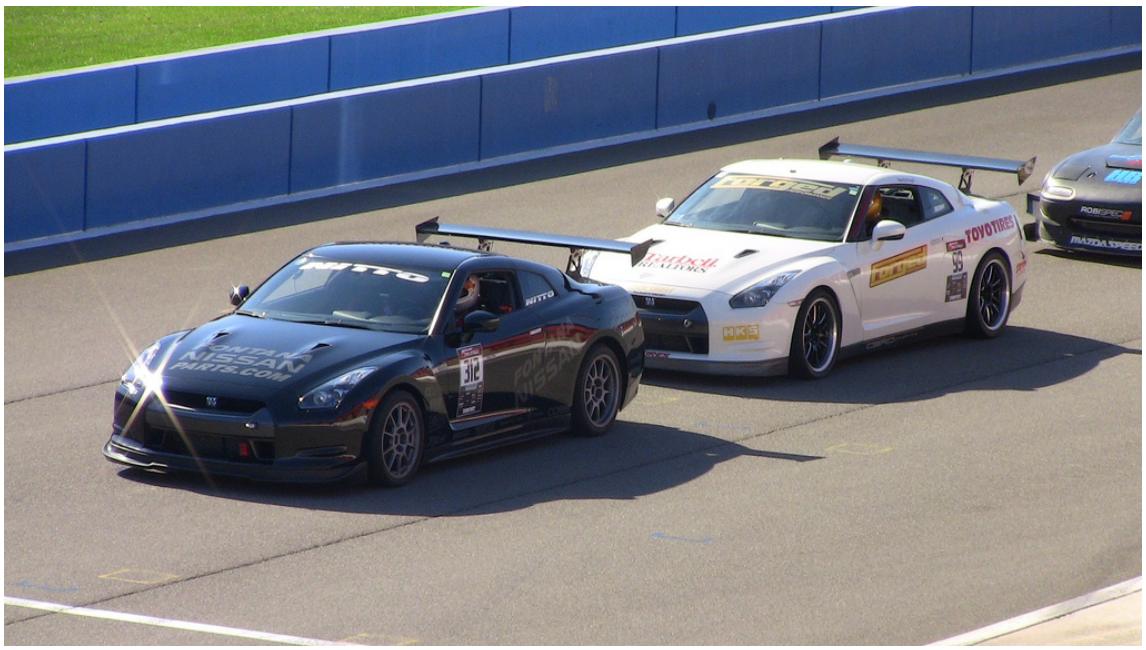
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User Manual: Dynamic Wing S2

1. Dynamic Wing S2

The S2 Dynamic Wings come with a plug and play tune specifically developed for your car. The controller will automatically provide ample downforce in corners, more when you brake, and lower drag on the straightaway.

The wing is programmed with angles tuned for your car.

- **B**raking Angle
  - The wing moves to this high downforce, high drag angle during braking.
- **M**aneuvering Angle (Low Speed Cornering)
  - This is the default wing angle. The wing at this position when the car is standing still, or cornering. Increasing or decreasing this angle will change the car's balance in corners.
- High Speed Maneuvering Angle (High Speed Cornering)
  - This angle allows a different maneuvering angle to be set for high speeds.
- **S**traightaway Angle
  - The wing moves to this low drag angle when it detects the car is on a straightaway.

Note, each racecar setup is unique. Dynamic Wings are programmed to work with the stock upper surfaces of the car. Any aerodynamic modification to the car, such as roof scoops or vortex generators, can change the airflow and necessitate adjustment to the tune.

2. Using the Optional Remote

Holding down a button will move the Dynamic Wing to that angle:

- B (Braking)
- M (Maneuvering Low Speed)
- MS (Maneuvering High Speed)
- S (Straightaway)

Note: when parked, holding M will not cause the wing to move; this is the default position when the car is at rest.

While holding the wing angle button, push the up or down arrow keys to change the angle of both wing halves. Holding the arrow key will cause the wing to move up or down until the arrow key is released. The computer will store this new angle when you let go of the angle button (B,M,S, MS).

NOTE: Angle adjustments are very fine near the highest and lowest angles of attack.

Remote Programmer

3. Pre-Flight Check

When the power is turned ON, the wing performs a startup check. The wing will move to each of the programmed angles. Watch to ensure the wing moves smoothly, and freely. The wing will skip this check if the car starts to drive.

4. Basic Controller Operation

Track Maps

The stock tune is stored in track map 1. Holding down the "Track Map" button and pressing the "UP" or "DOWN" button cycles through ten different maps. The selected map is indicated on the 10 Segment LED by a single lit LED. Track Map "0" (all LED's flash as a block) locks out the wing at the Cornering angle. The wing will function as a static wing.

Split

Pressing the "Split" button toggles the split ON and OFF. When the "Split" is ON, the wing halves will move independently to aid weight transfer in cornering, and the "Split ON" LED will light up.

5. Advanced Controller Operation

Adjusting The Wing Angles

The wing angles are set by holding down any of the four "Wing Angle" buttons and adjusting the "UP" and "DOWN" buttons.

The "Left Set" and "Right Set" LED's indicate which wing halves will be moved. This can be toggled by pressing the "Left Set" or "Right Set" buttons. If both lights are on, both wing halves will move when holding a wing angle button, and pressing the UP or DOWN arrows. If only the right light is on, pressing the UP or DOWN arrow will only move the right side.

Cornering Angle

Turn the wing on. After the pre flight check, the wing will be in the Cornering angle. Pressing and holding the Cornering angle will allow you to adjust the angle. *Note: since this is the default angle, pressing this button will not cause the wing to move.*

Trim both wing halves to the correct angle. To move the Right wing half (passenger side) only, toggle the right LED on (Click "R"). Holding the Low Speed Cornering button down, press the UP or DOWN arrow to adjust the Right wing half.

Trimming Wing Angles

Trim each of the other wing angles by holding the given button. The wing will move to the set angle when the button is held down. The angles can only be adjusted when the corresponding button is held down. Releasing the button will cause the wing to return to the Cornering Angle.

Braking Threshold

Holding down the "Braking Threshold" button allows the deceleration value that causes the wing to move to "Braking Angle" to be adjusted using the "Up" and "Down" buttons. The "Braking Threshold" value is displayed on the 10 Segment LED where each lit LED is $1/10^{th}$ of a G.

Acceleration Threshold

Holding down the "Acceleration Threshold" button allows the acceleration value that causes the wing to move to the "Straightaway" angle to be adjusted using the "UP" and "DOWN" buttons. The "Acceleration Threshold" value is displayed on the 10 Segment LED where each lit LED is $1/10^{th}$ of a G.

Speed Set

Checking the VSS Pulse and Scaling
Holding down the "Speed Set" button puts the controller in Speed Setup mode. Speed Set mode is used to check that the controller is getting an accurate speed reading from the Vehicle Speed Sensor (VSS)

While holding the Speed Set Button, The 10 segment LED will flash with each pulse from the VSS as the car is driven forward. This is best observed at low speeds. After verifying the pulses at low speed, the 10 Segment LED can be used to verify the accuracy of the scaling. Above 50 mph, the LED's on the 10 Segment LED will light to indicate the vehicle speed. Each LED represents 10 mph over 50 mph. One lit LED indicates 60mph. Two lit LED's is 70mph, and 5 lit LED's would shows 100mph.

Setting the Speed Threshold
The speed threshold determines when the wing reduces angle for high speed straightaways. To adjust the speed threshold, hold down the "Speed Set" button and the "Straightaway" button and adjust the "Straightaway Speed Threshold" using the "UP" and "DOWN" buttons. The "Straightaway Speed Threshold" will be displayed on the 10 Segment LED as described above: each lit LED represents 10 mph over 50 mph.

Show Mode:

Hold the down arrow when powering the computer (car) on.

6. Legal Notice

PROFESSIONAL INSTALLATION IS HIGHLY RECOMMENDED and products are understood by consumer to be OFF-ROAD USE ONLY upon purchase. RACING IS INHERENTLY DANGEROUS. The consumer assumes responsibility and all liability associated with operating an aeromotions wing upon purchase. CHECK ALL EQUIPMENT before racing. Car setup is unique. The consumer is responsible for ensuring the correct setup, tuning, and working of the Dynamic Wing with their vehicle setup.